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AXIOMATIC FOUNDATIONS OF DIFFERENTICS v1.0

The First Formal Framework of the General Logic of Difference

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Abstract

Differentics is proposed as a theoretical interdisciplinary discipline devoted to the study of differences, their relations, interactions, recursions, and the structures and processes that emerge from them.

The central proposition of Differentics is that Difference constitutes the minimal logical condition necessary for distinction, identification, information, organization, transformation, and emergence.

This document establishes the first axiomatic foundation of Differentics by defining its primitive concepts, axioms, postulates, derived principles, and initial theorems.

The purpose of this framework is not to replace existing scientific, mathematical, philosophical, or informational theories, but to provide a more general logical layer through which phenomena from multiple disciplines may be interpreted and compared.

1. Introduction

Throughout the history of science and philosophy, various foundational entities have been proposed as the primary constituents of reality.

Examples include:

- matter,
- energy,
- information,
- consciousness,
- space,
- time,
- mathematical structure.

Differentials begins from a different starting point.

It proposes that before any identifiable object, system, process, relation, measurement, or observation can exist, a Difference must already be present.

Without Difference, no distinction can be made.

Without distinction, no identification can occur.

Without identification, no structure, information, process, or system can be recognized.

Therefore, Difference is proposed as the minimal logical prerequisite for all identifiable phenomena.

2. Scope of Differentials

Differentials does not attempt to replace:

- physics,
- mathematics,
- biology,

- computer science,
- information theory,
- cognitive science,
- philosophy.

Instead, it seeks to investigate a more general question:

What are the logical consequences of the existence of Difference itself?

The discipline focuses on:

- differences,
 - relations among differences,
 - interactions among differences,
 - recursive generation of differences,
 - structures emerging from differences,
 - dynamics emerging from differences,
 - connectivity emerging from differences.
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3. Primitive Concepts

The following concepts are treated as primitive within Version 1.0 and are not formally derived inside this document.

DIFFERENTH

Difference.

The minimal condition that permits distinction.

NODIFFERENTH

Absence of Difference.

A conceptual state in which no distinction can be established.

RELATH

Relation between differences.

INTERACTH

Interaction among differences.

RECURSITH

Recursive generation or propagation of differences.

CERELATH

Cause–Effect Relationship.

A directional dependency connecting differences and their consequences.

4. Fundamental Axioms

The following axioms constitute the minimal formal foundation of Differentials.

Axiom D1

Existence of Difference

Difference exists.

Symbolically:

D1:

Difference Exists

This axiom serves as the starting proposition of the theory.

Axiom D2

Principle of Distinguishability

Without Difference, no distinction can be established.

Symbolically:

$\neg \text{Difference} \rightarrow \neg \text{Distinction}$

This axiom states that distinction is logically dependent upon Difference.

Axiom D3

Principle of Identification

Every identification requires Difference.

Symbolically:

$\text{Identification} \Rightarrow \text{Difference}$

No object, state, event, or process can be identified without some distinguishable characteristic.

5. Fundamental Postulates

The following postulates describe the general behavior expected from systems containing differences.

Unlike axioms, they are not considered self-evident logical necessities but rather foundational assumptions regarding the organization of differences.

Postulate P1

Structural Emergence

Relations among differences generate structure.

Difference Relations $\rightarrow$ Structure

Postulate P2**Dynamic Emergence**

Interactions among differences generate dynamics.

Difference Interactions $\rightarrow$ Dynamics

Postulate P3**Diversity Emergence**

Recursive generation of differences produces diversity.

Difference Recursion $\rightarrow$ Diversity

Postulate P4**Connectivity Emergence**

Cause–effect relationships among differences generate connectivity.

Difference CERELATH $\rightarrow$ Connectivity

6. Derived Principles

From Axioms D1–D3 and Postulates P1–P4, the following principles may be derived.

Principle DP1

No Structure Without Difference

If no Difference exists, no distinguishable structure can emerge.

Principle DP2

No Information Without Difference

Information requires distinguishable states.

Distinguishable states require Difference.

Therefore:

Information requires Difference.

Principle DP3

No Change Without Difference

Change presupposes a distinction between at least two states.

Therefore:

Change requires Difference.

Principle DP4

No Identification Without Difference

Identification depends upon distinction.

Distinction depends upon Difference.

Therefore:

Identification depends upon Difference.

Principle DP5

Difference Precedes Description

A phenomenon must first be distinguishable before it can be described.

Therefore:

Difference logically precedes description.

Principle DP6

Difference Precedes Measurement

Measurement compares distinguishable states.

Therefore:

Difference logically precedes measurement.

7. Generative Sequence of Differentials

The foundational sequence proposed by Differentials is:

NODIFFERENTH

↓

DIFFERENTH

↓

DISTINCTION

↓

IDENTIFICATION

↓

RELATH

↓

STRUCTURE

↓

INTERACTH

↓

DYNAMICS

↓

RECURSITH

↓

DIVERSITY

↓

CERELATH

↓

CONNECTIVITY

This sequence represents the first-order logical progression of the theory.

8. ADP–TRIFORMER Interpretation

Within the ADP–TRIFORMER methodology, Difference functions as the transformational operator connecting states.

General form:

A

↓

DIFFERENTIAL

↓

B

This may be interpreted as:

State A

through Difference

becomes

State B

The model does not specify the nature of A or B.

The model specifies only the logical role of Difference in transformation.

Thus ADP–TRIFORMER functions as the primary methodological framework of Differentials.

9. The First Theorem of Differentials

Theorem T1

Without Difference, no identifiable system can exist.

Proof

1. Identification requires Difference (Axiom D3).
2. Without Difference, distinction is impossible (Axiom D2).
3. Without distinction, identification cannot occur.
4. A system that cannot be identified cannot be formally recognized as a system.
5. Therefore, without Difference, no identifiable system can exist.

Q.E.D.

10. The Second Theorem of Differentics

Theorem T2

Information requires Difference.

Proof

1. Information requires distinguishable states.
2. Distinguishable states require Difference.
3. Therefore information requires Difference.

Q.E.D.

11. The Third Theorem of Differentics

Theorem T3

Change requires Difference.

Proof

1. Change implies a distinction between states.
2. Distinction requires Difference.
3. Therefore change requires Difference.

Q.E.D.

12. Epistemological Position

Differentics does not claim that Difference is the ultimate metaphysical origin of reality.

Version 1.0 makes a more limited claim:

Difference is the minimal logical condition required for distinction, identification, information, structure, and change.

Questions regarding:

- the origin of Difference,
- metaphysical causes preceding Difference,
- transcendent foundations beyond Difference,

remain outside the scope of this document.

Such questions may be addressed by separate ontological, metaphysical, or theological frameworks.

13. Potential Areas of Application

The framework of Differentials may potentially be applied to:

- mathematics,
- logic,
- information theory,
- systems theory,
- cybernetics,
- artificial intelligence,
- cognitive science,
- biology,
- social systems,
- linguistics,
- philosophy of science,
- ontology.

The applicability of the theory to specific domains remains a subject for future investigation.

14. Conclusion

Differentials proposes Difference as the minimal logical prerequisite for distinction, identification, information, structure, dynamics, diversity, and connectivity.

The axioms and postulates presented in this document establish the first formal foundation of the discipline.

From these foundations, additional mathematical, informational, computational, physical, biological, cognitive, and philosophical models may be developed in future versions of the theory.

Version 1.0 should therefore be understood as the foundational axiomatic layer of the broader Differentics research program.

Author Statement

This document constitutes the first public axiomatic formulation of Differentics as an independent theoretical discipline dedicated to the General Logic of Difference.

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